



International Migratory Bird Day (IMBD), held annually on the second Saturday in May, is an invitation to celebrate and support migratory bird conservation.

Climate Change

The Basics on a Hot Topic

The average surface temperature of the Earth increased by 0.7 degrees Celsius between the late 1800s and 2000, and is now warming even more rapidly, at the rate of 0.2 degrees Celsius per decade.

Why is global temperature increasing?

The layer of gases that form the atmosphere of the Earth prevents some of the energy received from the sun from radiating back into space. These gases, which include carbon dioxide (CO₂), methane and water vapor, and their “greenhouse effect,” enable our planet to maintain a temperature warm enough to sustain life.

Since the Industrial Revolution, humans have changed the natural balance of atmospheric gases through the burning of fossil fuels such as coal, oil and gas. In the U.S., 98% of all carbon dioxide emissions (and 24% of its methane emissions) is caused by the burning of fossil fuels to drive our cars and trucks, heat our buildings, and run our power plants and factories. Higher levels of CO₂ and other greenhouse gases trap extra heat near the earth’s surface. This heat can cause average surface temperatures to rise and change the Earth’s

climate, which describes all aspects of the weather over a period of time.

Changes in land use and deforestation contribute to CO₂ levels in the atmosphere. Trees grow by “breathing” in CO₂ and destruction of large areas of tropical and Boreal forests has removed their ability to act as carbon “sinks” (areas where the extra CO₂ could be absorbed). The burning of forests also contributes to the problem as it releases the CO₂ locked up in the wood of the trees.

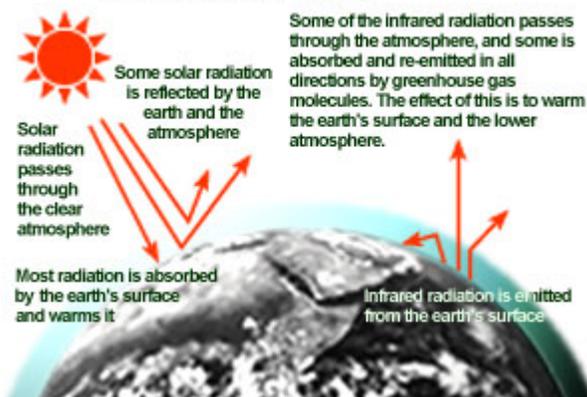
The slow but steady increase in the earth’s temperature since the late 19th century could be a result of the increased level of greenhouse gases in our atmosphere. There is a consensus among scientists that the global temperature change is probably caused by human activities and is “unlikely” to be natural in origin (according to the IPCC, an international panel of scientists created to assess the reality of climate change).

IMBD Information
web - <http://birds.fws.gov/imbd>
phone - 703/358-2318

IMBD Materials
web - <http://www.BirdDay.org>
phone - 1-866/334-3330

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The Greenhouse Effect



Source: U.S. EPA Climate Change Website

What are the effects of climate change?

The Earth's temperature is now (on average) one degree higher on land and across the oceans than a century ago. The change may be increasing, as the warmest 10 years of the 20th Century occurred in the last 15 years, and 1998 was the warmest year on record. This change has affected many parts of the Earth:

The Arctic:

- snow cover (declined by 10 percent since the late 1960s)
- retreating mountain glaciers
- Arctic sea ice (reduced by roughly 40 percent in thickness over the past several decades)

Coastal Areas:

The warming that occurred over the 20th century was accompanied by an increase in global sea level of 4-8 inches. This, in turn, has had an effect on coastal areas, such as

- *Louisiana* : (coastal marsh erosion and inundation of marsh wetlands) Losses in Louisiana account for up to 80% of total U.S. coastal wetland loss.
- *Chesapeake Bay* : The rate of sea level rise in the Bay is twice the global average- rising sea level is turning marshland into ponds, changing shallow water habitat into deeper water, and altering food chains and food availability for the Bay's wildlife.

If trends continue as expected, sea level may rise between several inches and as much as 3 feet during the next century.



Oceans:

Tropical sea temperatures have increased by 1 degree Celsius over the past 100 years and are now increasing at the rate of 1-2 degrees per century.

Higher water temperature causes

- Increased acidity of water (carbon absorption by seawater produces carbonic acid)
- Changes in circulation patterns of deep ocean waters
- Alterations in upwelling process
- Changes in atmospheric pressure affected by sea surface temperature- stronger winds may increase the frequency and strength of storms and hurricanes
- Bleaching of coral reefs

Forests:

- Western Boreal Forest: has already warmed by 2-2.5%
- Amazon: regional increase of 2-3°C has led to widespread drying and less precipitation in the Amazon during dry months



Global -- Timing of Spring Events:

- Earlier breeding or first singing of birds
- Earlier appearance of butterflies and arrival of migrant birds
- Earlier choruses and spawning of amphibians
- Earlier shooting and flowering of plants

Global -- Weather Patterns:

- Extreme precipitation events increased by as much as 4% during the 20th century
- Some areas experiencing drought as a result of higher evaporation.
- Changes in timing and length of seasons

Aren't we just experiencing a normal cycle of climate change?

Earth's climate is constantly changing due to natural causes, but human activities seem to be altering the climate quickly and dramatically. Since the mid-1800s, CO₂ in the atmosphere has risen more than 30%, and is now higher than it has been in the last 400,000 years. The predicted effects of more atmospheric CO₂ on the rate of temperature change are alarming: by 2100, the average temperature is expected to rise ten times faster than what has been the average rate of sustained change since the last ice age.



How will climate change affect life on Earth in the future?

Animal and plant populations are already reacting to the impact of global warming. The changes documented in habitats around the world result in changes in behavior, species occurrence (e.g., an increase in invasive species) and even chemical and nutrient composition in plants.

The combination of rapid temperature rise and habitat destruction caused by warming could profoundly affect the ultimate survival of different species.

Sources for further reading:

Environmental Protection Agency website (November 2006):
<http://www.epa.gov/climatechange/>

IPCC Report 2001:
<http://www.ipcc.ch/>

National Climatic Data Center/
NOAA website (November 2006)
<http://www.ncdc.noaa.gov/oa/climate/climateextremes.html>